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TITLE : ATOMIC LAYER PLANAR DOPING METHOD

ABSTRACT : PURPOSE: To make it possible to remarkably increase the doping quantity of dopant when compared with that heretofore in use by a method wherein, when a dopant is doped on a compound semiconductor by discontinuing the epitaxial growth while a III-V compound semiconductor is being grown using a molecular beam epitaxial growing method, a specific N-type dopant is used.

CONSTITUTION: When a dopant is doped using an atomic layer planar doping method while a compound semiconductor is being formed by conducting a molecular beam epitaxial growing method, laticematching can be improved by using $\text{Si}_{1-x}\text{Ge}_x$ as an N-type dopant in comparison with the case where Si is used as a dopant. Also, the mixture ratio of $\text{Si}_{1-x}\text{Ge}_x$ is provided separately for Si cell and Ge cell, which can be obtained by adjusting the strength ratio of each molecular beam. At this point, if the molecular beam strength ratio $J_{\text{Ge}}/J_{\text{Si}}$ of Ge and Si is set small, the vapor pressure of the adhered substance becomes low sufficiently, it is hardly sublimated by the heat coming from the substrate and the cells, and no effect is given to the quality of the film grown on the compound substrate. As a result, the doping quantity of the dopant can be increased remarkably while the quantity of the compound semiconductor film is being maintained, and the doping quantity of the dopant can be increased remarkably when compared with that heretofore in use.

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